SOCIAL DISTANCING SYSTEM

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1. ABSTRACT

- This project presents an innovative approach to monitor and enforce social distancing guidelines using computer vision and deep learning. By analysing video streams captured by surveillance cameras, the system employs advanced algorithms to detect and track individuals in real time. Deep learning models are utilized to estimate the distance between people accurately. When violations of social distancing guidelines are detected, the system triggers alerts to notify authorities or individuals. This automated system offers improved accuracy, scalability, and efficiency compared to traditional manual monitoring methods. It has the potential to be deployed in various public spaces, contributing to public safety and compliance with social distancing measures.

2. INTRODUCTION

- The outbreak of the COVID-19 pandemic has highlighted the critical importance of social distancing as a means to control the spread of infectious diseases. To address this challenge, computer vision and deep learning techniques have emerged as powerful tools for monitoring and enforcing social distancing guidelines. By leveraging advanced algorithms and models, these technologies enable real-time analysis of video footage to detect and track individuals while accurately measuring the distance between them. This project aims to explore the application of computer vision and deep learning in creating an automated system that can effectively monitor social distancing in public spaces. Such a system has the potential to enhance public safety and contribute to the overall well-being of society.

3. MOTIVATION BEHIND THE PROBLEM

- The COVID-19 pandemic has highlighted the need for effective monitoring and enforcement of social distancing guidelines in public spaces. Traditional manual methods are time-consuming and prone to errors. Computer vision and deep learning offer an automated solution that can accurately detect and address instances of non-compliance. By leveraging these technologies, we can enhance public safety, reduce human error, and contribute to global efforts in controlling the spread of infectious diseases.

4. BACKGROUND

- The COVID-19 pandemic has necessitated the implementation of social distancing measures to mitigate the spread of the virus. Monitoring and enforcing these guidelines in public spaces can be challenging. Computer vision and deep learning technologies offer automated solutions by

analyzing video footage to detect and track individuals in real time while accurately measuring their distance. This project aims to leverage these technologies to develop an intelligent monitoring system that enhances social distancing compliance in diverse public settings, contributing to public safety and disease control efforts.

5. OUR APPROACH

- In our project, we utilized the YOLOv3 object detection algorithm and the OpenVINO person-detection-0202 model. YOLOv3 enabled real-time detection of people in video frames, while OpenVINO optimized the performance of the system. By comparing distances between individuals and a predefined threshold, we identified instances of inadequate social distancing and triggered alerts for intervention. Our approach integrated these technologies to create an efficient and accurate social distancing monitoring system.

6. RESULTS

- Results of the Yolov3 Approach:

- Results of the OpenVINO Approach:

7. REFERENCES

[1] Yew Cheong Hou, MohdZafriBaharuddin, Salman Yussof, SumayyahDzulkifly, "Social Distancing Detection with Deep Learning Model" 2020 8th International Conference on Information Technology and Multimedia (ICIMU)

[2] Rucha Visal, Atharva Theurkar, Bhairavi Shukla, "Monitoring Social Distancing for Covid-19 Using OpenCV and Deep Learning" 2020 International Research Journal of Engineering and Technology (IRJET).

[3] Narinder Singh Punn, Sanjay Kumar Sonbhadra and Sonali Agarwal, "Monitoring COVID-19 social distancing with person detection and tracking via fine-tuned YOLO v3 and Deepsort techniques"

[4] Vinitha.V,Velantina.V,"Social distancing detection system with artificial intelligence using computer vision and deep learning" 2020 International Research Journal of Engineering and Technology (IRJET).

[5] Q. Zhao, P. Zheng, S.-t. Xu, and X. Wu, "Object detection with deep learning: A review", IEEE transactions on neural networks and learning systems, vol. 30, no. 11, pp. 3212–3232, 2019.

[6] N. S. Punn and S. Agarwal, "Crowd analysis for congestion control early warning system on foot over bridge", in 2019 Twelfth International Conference on Contemporary Computing (IC3). IEEE, 2019, pp. 1–6.

[7] YOLOv3 ("https://viso.ai/deep-learning/yolov3-overview/")

[8] OpenCV ("https://opencv.org/")

[9] OpenVINO (https://docs.openvino.ai/2023.0/home.html)

8. LINKS TO SOLUTION

- Code/Results:

  Github Link : https://github.com/rohitviswam/intelrepo

  Yolov3 output Youtube link: https://youtu.be/xVtWRANJNyU

  OpenVINO output Youtube link: https://youtube.com/shorts/Sfc5akFI-PQ?feature=share

- Model link :

  Yolov3 Model link :
  https://drive.google.com/file/d/1qkxZ8mKO0vqnagxGxIa5UKR0q1QaPbw0/view

  OpenVINO person-detection-0202 Model link:
  https://github.com/rohitviswam/intelrepo/tree/main/rohit_MITmanipal_Social-Distancing-project-using-Computer-Vision-and-Deep-Learning/Optimised%20Project/model/person-detection-0202/FP16-INT8